Procedures for Reducing Residual Volume Data

Summarize the data for each line separately. The basic formula is:

$$Volume/Acre = \frac{\pi^2 \Sigma d^2}{8L} \cdot \frac{43{,}560}{144}$$

where: Volume/acre is in cubic feet
d is the piece diameter on the line in inches
L is the length of the sample line in feet

1. For each diameter class, multiply the squared diameter by the tally for that class.
2. For pieces over 10", sum the squared diameters.
3. Sum the results for all diameter classes and plug into the equation as d^2.
4. Use the actual line length for L and calculate Volume per Acre.

Example:

		Tally by 1" Diameter Classes (>2")									
Line	Azm	2"	3"	4"	5"	6"	7"	8"	9"	10"	10+
1	324°	𝍸	𝍸	𝍸	𝍸	𝍸	𝍸			𝍸	12, 14
d^2		4	9	16	25	36	49	64	81	100	144, 196
d^2 x Tally		32	18	16	75	72	147	0	0	100	340

Sum of the squared diameters = 700 in^2

$$Volume/Acre = \frac{\pi^2 \cdot 700 \cdot 43{,}560}{8 \cdot 100 \cdot 144} = 2{,}612.4\ ft^3$$

5. Determine the mean and SD of volume/acre over all lines in the block.

6. Sum the tallys for each diameter class over all the lines and create a bar chart that shows percent of total pieces in each diameter class.

References

Howard, J.O. and Ward, F.R. 1972. Measurement of logging residue--alternative applications of the line intersect method. USDA-FS Res. Note PNW-183, 8 p.

Van Wagner, C.E. 1968. The line intersect method in forest fuel sampling. For. Sci. 14(1):20-26.